

Chapter 3 • Tissues in Action

PLAY & LEARN

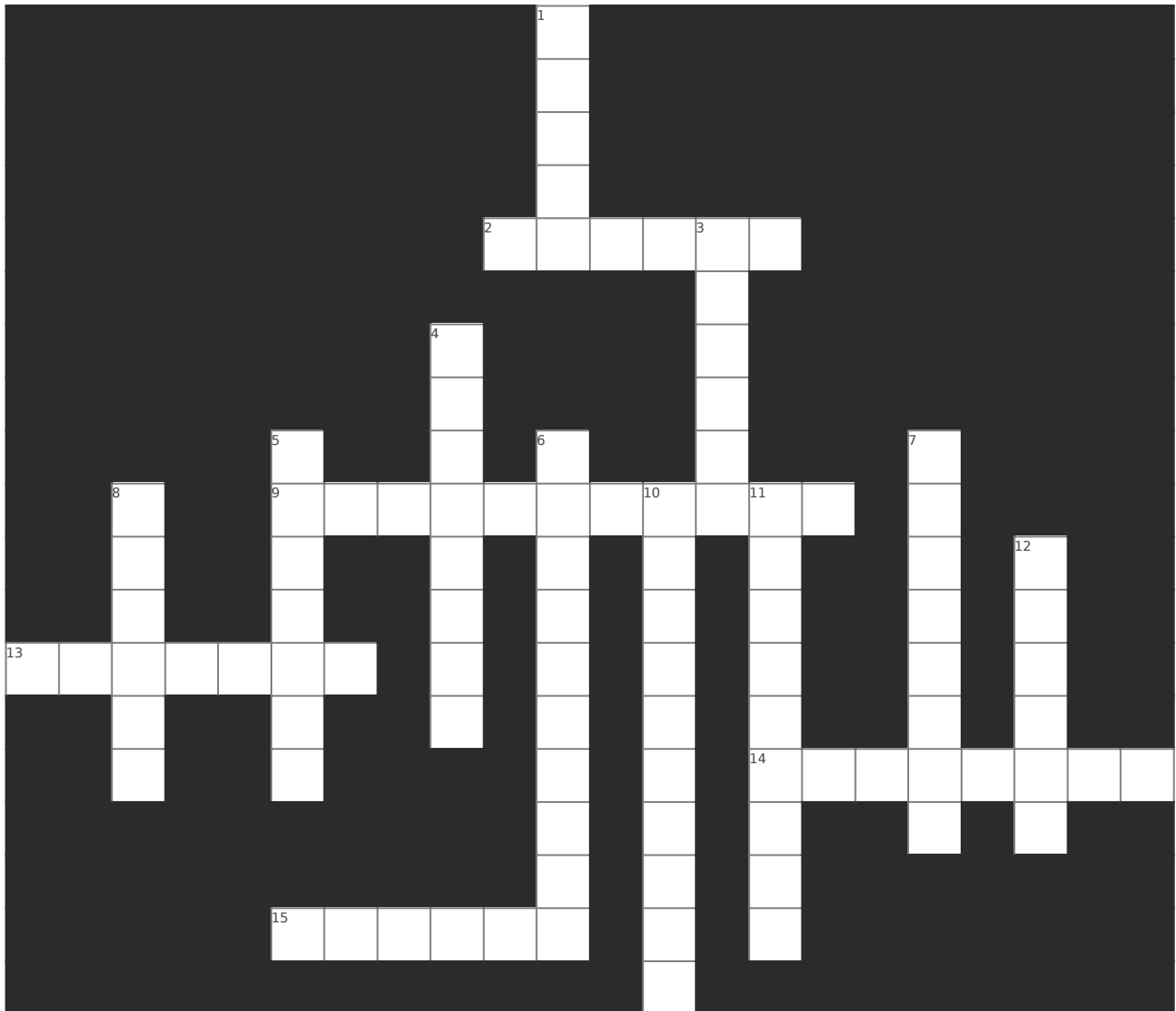
A puzzle workbook — crosswords, word searches, scrambles and quiz games

Print it. Solve it. Race a friend. Answer keys are at the back — no peeking.

#	Puzzle	Play it	Time
1	The Crossword	Solo or pairs	15 min
2	Word Search	Solo — race the clock	10 min
3	Scrambled Terms	Solo	8 min
4	Odd One Out	Teams of 4	10 min
5	Chapter Scrabble	Groups of 3-4	20 min
6	Who Am I? — Clue Cards	Whole class	15 min
7	True or False Sprint	Whole class, standing	6 min
8	Bingo	Whole class	15 min
9	Two Truths and a Lie	Pairs	10 min
10	The Escape Challenge	Teams of 4	25 min

Puzzle 1 · The Crossword

Every answer is a word from this chapter. Fill the white squares — one letter per square.



ACROSS

- 2. involuntary muscle found in the gut and blood vessels (6)
- 9. ability of a cell to regrow a whole organism (11)
- 13. type of involuntary striated muscle found only in the heart (7)
- 14. connects bone to bone at a joint (8)
- 15. a group of similar cells performing the same function (6)

DOWN

- 1. plant tissue that transports water upward (5)
- 3. connects muscle to bone (6)
- 4. actively dividing plant tissue at growing tips (8)
- 5. pores on a leaf surface for gas exchange (7)
- 6. tissue type that includes bone, blood and cartilage (10)
- 7. voluntary striated muscle attached to bones (8)
- 8. the basic cell of nervous tissue (6)

- 10.** tissue that covers and lines body surfaces (10)
- 11.** smooth, flexible connective tissue at joints (9)
- 12.** plant tissue that transports food (6)

Puzzle 2 · Word Search

16 terms are hiding in the grid — across, down, diagonally, and backwards. Circle each one, then tick it off the list. Beat 10 minutes and you win.

T	N	E	U	R	O	N	T	H	I	O	C	G	G	M
T	S	Z	P	S	K	H	Y	O	W	E	B	F	F	E
G	X	H	A	H	I	T	J	P	V	T	X	S	X	U
H	M	C	K	I	H	O	J	P	R	J	L	A	Y	S
H	E	A	L	U	T	O	S	J	H	A	L	H	L	S
Z	T	R	Z	Q	M	M	K	C	T	C	L	O	E	I
O	S	T	P	L	O	S	P	E	S	N	H	B	M	T
D	I	I	H	F	Q	A	L	I	G	A	M	E	N	T
Y	R	L	L	Y	J	E	U	Z	R	C	S	V	L	G
W	E	A	O	Y	K	V	C	A	R	D	I	A	C	T
G	M	G	E	S	L	E	N	O	D	N	E	T	D	U
Q	G	E	M	Q	I	T	U	W	L	N	F	I	E	Q
O	J	F	J	T	N	I	O	J	S	E	O	N	M	T
A	C	B	L	O	O	D	H	P	A	H	O	D	Q	Y
P	Y	P	S	T	O	M	A	T	A	B	E	R	E	X

☐ CARTILAGE	☐ MERISTEM	☐ LIGAMENT
☐ SKELETAL	☐ STOMATA	☐ CARDIAC
☐ PHLOEM	☐ NEURON	☐ TENDON
☐ SMOOTH	☐ TISSUE	☐ XYLEM
☐ BLOOD	☐ JOINT	☐ BONE
☐ NODE		

Race Rules

- **Solo:** find all the words. Note your time at the top of the page.
- **Pairs:** one partner finds across-and-down words, the other finds diagonals. First pair to complete the list wins.
- **Hard mode:** cover the word list. Find as many chapter terms as you can in 5 minutes.
- **Champion move:** for every word you find, say what it means out loud. No meaning, no point.

Puzzle 3 · Scrambled Terms

Every row is a chapter word with its letters shuffled. Unscramble it. The clue in brackets is your lifeline — try to solve without it first.

#	Scrambled letters	Clue	Your answer
1	ETEIALLPHI	(covers and lines body surfaces)	_____
2	LSCARUAV	(bundle carrying xylem and phloem together)	_____
3	NOVRYUTAL	(movement you consciously control)	_____
4	LTAIUYNVRN	(movement you cannot consciously control)	_____
5	DRAEEFIETFITERDN	(a mature cell that becomes meristematic again)	_____
6	TVAEBLERR	(___ column — the backbone)	_____
7	E A A R L T L	(___ meristem — increases girth of stems and roots)	_____
8	REEPNANTM	(___ tissue — cells that have stopped dividing)	_____

□ Make It a Game

Beat the Bell: the teacher sets a 60-second timer. Every unscrambled word inside the bell = 1 point; a word you can also *define* = 3 points.

Chain Scramble: in a circle, each student scrambles a chapter word for the person on their left. Miss it and you are out. Last student standing wins.

Puzzle 4 · Odd One Out

Three belong together. One does not. Circle the odd one — then write why in one line. The "why" is where the marks are.

#	Which is the odd one out?	Because...
1	Xylem · Phloem · Meristem · Neuron	_____
2	Skeletal · Smooth · Cardiac · Epithelial	_____
3	Tendon · Ligament · Cartilage · Stomata	_____
4	Apical · Lateral · Intercalary · Permanent	_____
5	Bone · Blood · Cartilage · Nervous tissue	_____
6	Voluntary · Skeletal · Striated · Cardiac	_____

Puzzle 5 · Chapter Scrabble

Play in groups of 3–4. You have one shared rack of letter tiles. Build only terms from this chapter — no ordinary English words allowed.

Your tile rack — cut these out or write them on paper squares:

A 1	B 3	C 3	D 2	E 1	G 2	H 4
I 1	L 1	M 3	N 1	O 1	P 3	R 1
S 1	T 1	U 1	V 4	X 8	Y 4	Z 10

Scoring:

You did this	Points
Each letter tile used	Its tile value
Word is a term from this chapter	× 2
Word is 8 letters or longer	+ 10 bonus
You can state its meaning correctly	+ 5
You can connect it to a real-life example	+ 3
Word is <i>not</i> in this chapter (challenged and lost)	– 5

□ How a Round Works

1. Player builds a word from the rack and lays it down.
2. Any opponent may **challenge** within 10 seconds: "That's not in this chapter."
3. Open the textbook. If the challenger is right, the word is removed and the builder loses 5 points. If the challenger is wrong, the *challenger* loses 5 points.
4. Builder states the meaning to claim the +5 bonus. The group votes on whether it was correct.
5. Play 6 rounds. Highest total wins.

□ Target Words (worth the most — do not show your opponents)

MERISTEM · EPITHELIAL · CARTILAGE · INVOLUNTARY · REDIFFERENTIATED · VASCULAR · STOMATA · LIGAMENT

Puzzle 6 · Who Am I? — Clue Cards

Cut along the lines. One student draws a card and reads only the first clue aloud; the class guesses. Wrong guess? Read clue 2. Fewer clues used = more points.

CARD 1 ① I carry water upward from root to leaf. ② I am made of dead, hollow cells. ③ I am xylem.	CARD 2 ① I carry food from leaves to the rest of the plant. ② I can transport both up and down. ③ I am phloem.
CARD 3 ① I am found only at growing tips. ② My cells divide constantly. ③ I am meristematic tissue.	CARD 4 ① I cover and protect body surfaces. ② Your skin is made of me. ③ I am epithelial tissue.
CARD 5 ① I connect muscle to bone. ② I am tough and fibrous. ③ I am a tendon.	CARD 6 ① I connect bone to bone. ② I stabilise your joints. ③ I am a ligament.
CARD 7 ① I am smooth, flexible connective tissue. ② You find me at the ends of bones and in your nose. ③ I am cartilage.	CARD 8 ① I am the basic cell of the nervous system. ② I carry electrical signals. ③ I am a neuron.
CARD 9 ① I am found only in the heart. ② I am striated but involuntary. ③ I am cardiac muscle.	CARD 10 ① I line your gut and blood vessels. ② I am involuntary and unstriated. ③ I am smooth muscle.
CARD 11 ① I let a single plant cell regenerate a whole plant. ② I underlie India's tissue-culture industry. ③ I am totipotency.	CARD 12 ① I am the pore on a leaf's surface. ② I control gas exchange and water loss. ③ I am a stoma.

Scoring: guessed after clue ① = **5 points** · after ② = **3 points** · after ③ = **1 point**

Puzzle 7 · True or False Sprint

Everyone stands. Teacher reads a statement. True → stay standing. False → sit down. Get it wrong and you are out. Last student standing wins.

#	Statement	Your call
1	Xylem transports food, phloem transports water.	☐ True ☐ False
2	Meristematic tissue is found only at growing tips.	☐ True ☐ False
3	Cardiac muscle is voluntary.	☐ True ☐ False
4	Cartilage is smoother and more flexible than bone.	☐ True ☐ False
5	Tendons connect bone to bone.	☐ True ☐ False
6	A tissue is a group of similar cells performing the same function.	☐ True ☐ False
7	Skeletal muscle is also called striated, voluntary muscle.	☐ True ☐ False
8	Stomata are found on the surface of bones.	☐ True ☐ False
9	Permanent tissue cells have generally stopped dividing.	☐ True ☐ False
10	Lateral meristem increases the length of a stem.	☐ True ☐ False
11	Neurons are the basic functional cells of nervous tissue.	☐ True ☐ False
12	Any mature plant cell can, in principle, be totipotent.	☐ True ☐ False
13	Smooth muscle is found in the walls of blood vessels.	☐ True ☐ False
14	Blood is classified as a type of connective tissue.	☐ True ☐ False

Puzzle 8 · Bingo

Each student fills the empty grid below with any 16 words from the word bank — in any order, one per box. The teacher then reads out meanings, not names. Cross a box only when its meaning is called. First to a full row, column or diagonal shouts BINGO.

Word bank — choose any 16:

Xylem	Phloem	Meristem	Epithelial
Cardiac	Skeletal	Smooth	Neuron
Cartilage	Tendon	Ligament	Stomata
Totipotency	Vascular	Apical	Lateral

Your bingo card:

□ Caller's List (teacher only — read the meaning, never the name)

① "I transport water upward through a plant." ② "I transport food through a plant." ③ "I am tissue found at actively growing tips." ④ "I cover and line body surfaces." ⑤ "I am involuntary, striated muscle found only in the heart." ⑥ "I am voluntary, striated muscle attached to bones." ⑦ "I am involuntary, unstriated muscle in the gut and vessels." ⑧ "I am the basic cell of the nervous system." ⑨ "I am smooth, flexible connective tissue at your joints." ⑩ "I connect muscle to bone." □ "I connect bone to bone." □ "I am the pore on a leaf that controls gas exchange." □ "I let one plant cell regenerate a whole plant." □ "I am the bundle carrying xylem and phloem together."

Puzzle 9 · Two Truths and a Lie

Each set has three statements. Two are true, one is a lie. Circle the lie — and correct it in one line.

Set 1

- (a) Xylem cells are living.
- (b) Xylem transports water upward.
- (c) Xylem is a complex plant tissue.

The lie is _____. Corrected: _____

Set 2

- (a) Cardiac muscle is striated.
- (b) Cardiac muscle is voluntary.
- (c) Cardiac muscle is found only in the heart.

The lie is _____. Corrected: _____

Set 3

- (a) Cartilage is more rigid than bone.
- (b) Cartilage is found at the tip of your nose.
- (c) Cartilage cushions joints.

The lie is _____. Corrected: _____

Set 4

- (a) Meristematic cells divide continuously.
- (b) Permanent tissue cells divide continuously.
- (c) Apical meristem is found at root and shoot tips.

The lie is _____. Corrected: _____

Puzzle 10 • The Escape Challenge

Solve all five gates. Each gives you one digit. Collect all five to unlock the exit code.

□ GATE 1 — The Xylem Gate

Xylem cells are, at maturity: alive or dead? Count the letters in your one-word answer.

Digit: □

□ GATE 2 — The Muscle Gate

How many main types of muscle tissue are there (skeletal, smooth, cardiac)? Use that number.

Digit: □

□ GATE 3 — The Meristem Gate

How many main types of meristem are named in this chapter (apical, lateral, intercalary)? Use that number.

Digit: □

□ GATE 4 — The Neuron Gate

Count the letters in NEURON.

Digit: □

□ GATE 5 — The Joint Gate

A ligament connects bone to bone; a tendon connects muscle to bone. Count the letters in TENDON.

Digit: □

EXIT CODE: □ □ □ □ □

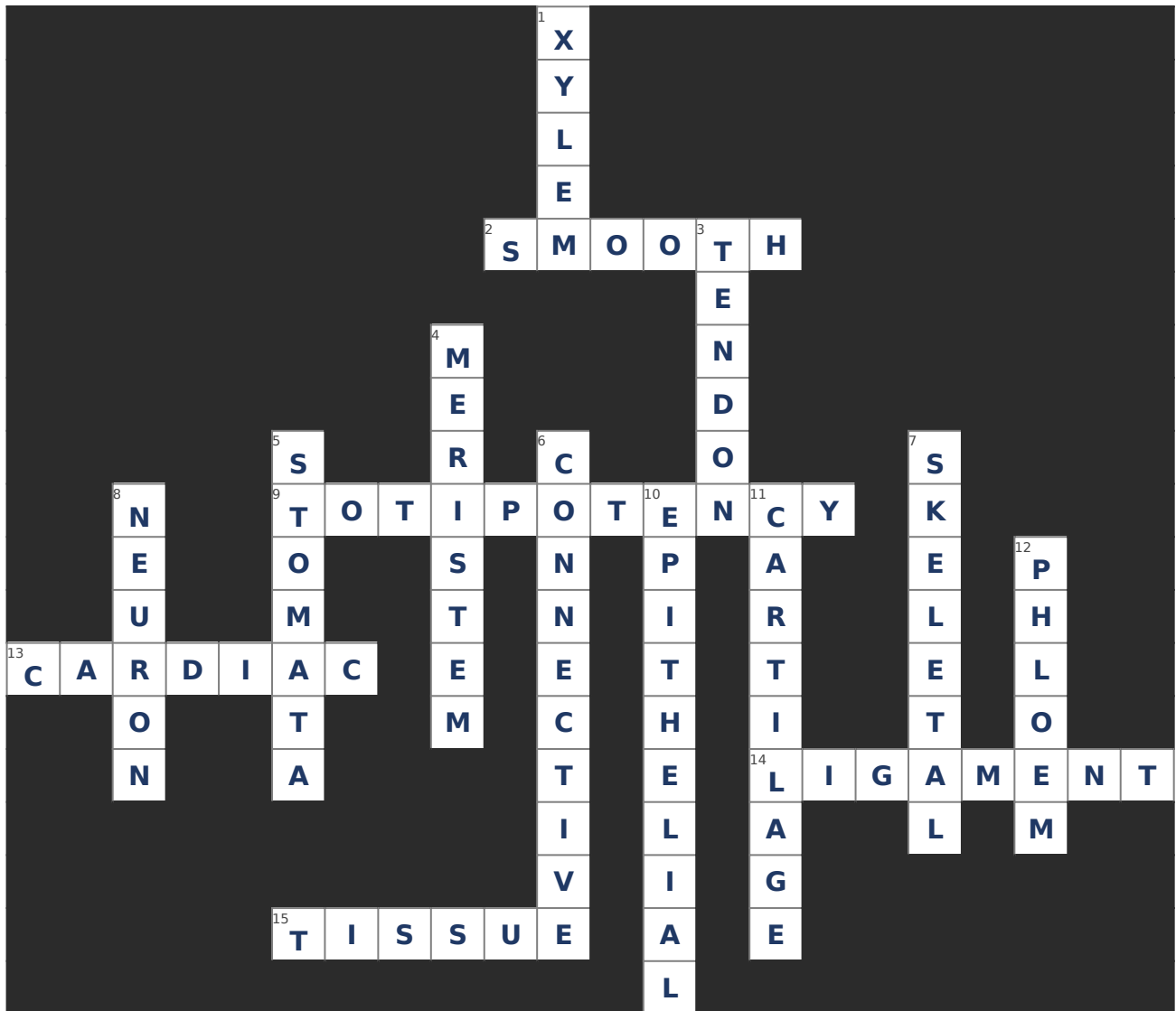
□ Teacher's note

Hide the gate cards around the classroom. Teams rotate every 4 minutes. First team to reach the door with the correct code escapes. Losing teams try again next period.

Answer Keys

Teachers and self-checkers only. Solve first — the puzzle is the point.

Puzzle 1 · Crossword — Solved Grid



Across: 2 SMOOTH · 9 TOTIPOTENCY · 13 CARDIAC · 14 LIGAMENT · 15 TISSUE

Down: 1 XYLEM · 3 TENDON · 4 MERISTEM · 5 STOMATA · 6 CONNECTIVE · 7 SKELETAL · 8 NEURON · 10 EPITHELIAL · 11 CARTILAGE · 12 PHLOEM

Puzzle 2 · Word Search — Solved Grid

T	N	E	U	R	O	N	T	H	I	O	C	G	G	M
T	S	Z	P	S	K	H	Y	O	W	E	B	F	F	E
G	X	H	A	H	I	T	J	P	V	T	X	S	X	U
H	M	C	K	I	H	O	J	P	R	J	L	A	Y	S

H	E	A	L	U	T	O	S	J	H	A	L	H	L	S
Z	T	R	Z	Q	M	M	K	C	T	C	L	O	E	I
O	S	T	P	L	O	S	P	E	S	N	H	B	M	T
D	I	I	H	F	Q	A	L	I	G	A	M	E	N	T
Y	R	L	L	Y	J	E	U	Z	R	C	S	V	L	G
W	E	A	O	Y	K	V	C	A	R	D	I	A	C	T
G	M	G	E	S	L	E	N	O	D	N	E	T	D	U
Q	G	E	M	Q	I	T	U	W	L	N	F	I	E	Q
O	J	F	J	T	N	I	O	J	S	E	O	N	M	T
A	C	B	L	O	O	D	H	P	A	H	O	D	Q	Y
P	Y	P	S	T	O	M	A	T	A	B	E	R	E	X

Puzzle 3 · Scrambled Terms

1. EPITHELIAL · 2. VASCULAR · 3. VOLUNTARY · 4. INVOLUNTARY · 5. REDIFFERENTIATED · 6. VERTEBRAL · 7. LATERAL · 8. PERMANENT

Puzzle 4 · Odd One Out

#	Odd one	Because
1	Neuron	the other three are plant tissues; neuron is an animal (nervous tissue) cell
2	Epithelial	the other three are muscle tissue types; epithelial is a separate tissue category
3	Stomata	the other three are connective-tissue structures; stomata are leaf pores
4	Permanent	the other three are types of meristem (dividing tissue); permanent tissue has stopped dividing
5	Nervous tissue	the other three are types of connective tissue
6	Cardiac	the other three describe skeletal muscle; cardiac muscle is involuntary, not voluntary

Puzzle 7 · True or False Sprint

1-F · 2-T · 3-F · 4-T · 5-F · 6-T · 7-T · 8-F · 9-T · 10-F · 11-T · 12-T · 13-T · 14-T

Puzzle 9 · Two Truths and a Lie

Set	The lie	Correction
1	a	Xylem cells are dead at maturity, which is part of what lets them form efficient hollow tubes.
2	b	Cardiac muscle is involuntary — you cannot consciously control your heartbeat.
3	a	Cartilage is more flexible, not more rigid, than bone.
4	b	Permanent tissue cells have generally stopped dividing.

Puzzle 10 · The Escape Challenge

EXIT CODE: 4 · 3 · 3 · 6 · 6

(DEAD = 4) (Answer: 3) (Answer: 3) (Answer: 6) (Answer: 6)

Time to sketch your own tissue map — where does each type sit in your own body? ☐☐